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## RMOTC RIG NO. 1

**R**MOTC Rig No. 1 is a 2005 Crown (Calgary, Canada) trailer mounted drilling rig. It incorporates several features found desirable over numerous drilling tests at RMOTC. The Crown Model Duke 750 has sufficient substructure height to allow for various BOP and surface equipment variations. The rig has sufficient derrick capacity and strength for the most demanding testing environments down to granite at 8,000'. The rig can be equipped for high pressure drilling up to 8,000 psi while rotating.

### Equipment Description

**Drawworks:** 2005 Crown Model CE750SD drawworks rated for 650-900 hp. The drawworks consists of a single drum, single shaft drawworks mounted on a heavy duty framework with sheet metal covers. Auxiliary braking is achieved with McKinney 23S Single Hydromatic brake. Main drum is 44 X 11 complete with brake bands and brake linkage. Drum is grooved for 1-1/8" line. Clutch size is 37VC650.

**Prime Mover:** Rig is equipped with two new Caterpillar C-15 ATAAC engines rated at 475 hp @ 2,100 rpm. The engines are complete with transmission cooler; hydraulic pump, air compressor, and instrument panel.

The Cat engines provide power through two Allison transmissions – Model S5610H rated up to 550 net hp. The transmissions are six speed models with a reverse.

Two Chelsea power take off (PTO) are transmission mounted.

The two transmissions are connected through a Crown compound drive. The compound drive provides power to a right angle gearbox rated at 900 hp. The right angle gearbox supplies power to the drawworks and to the rotary table through a reversing box.

**Mast:** Crown manufactured 118' X 375,000 lb guyed telescoping mast; hollow structural steel framing, designed and built in accordance with API 4F. Two 3-stage hydraulic cylinders are used for raising the mast and are equipped with safety chokes to prevent freefall.

Crown block assembly comes with three 30" fleet sheaves; one 36" fastline sheave; and one 30" deadline sheave.

Racking board has capacity for 7,400' of 4-1/2" drill pipe and 600' of 6-1/4" collar. Provisions to allow for drill pipe sizes from 3-1/2" to 6-5/8" and drill collar sizes from 4-11".

Two hydraulic cylinders, sheaves, rollers and cables for make-up and breakout mounted on back of mast. Hydraulic controls for make-up and breakout functions.

Two hydraulic winches (12,000 lb capacity) mounted on rig.

**Substructure:** Skid mounted manually raised telescoping substructure designed and built in accordance with API 4F. Floor height is 15' with 12' clearance under rotary beams. Main rig floor is 25-1/2' in width and 12' in length. Additional floor space is hinged behind the driller's console and off-driller's side. Setback capacity is 300,000 lb.

Gardner Denver rotary table, 275,000 lb load capacity and 400 ton dead load capacity.

#### **Mud Pumps (3):**

OPI-700 HDL triplex pump 6" X 8" cylinders, 700 hp, 120 spm. Powered by a Caterpillar 3412 turbo charged engine. Complete with radiator, fan muffler, and air flex clutch, with a 5" X 6" charge pump.

New 2004 Gardner Denver HD2000 triplex pump rated for 1,100 BHP; maximum rpm of 300; stroke length of 8". Powered by a new 3508B DI TA 1,100 hp, 1,800 rpm Caterpillar engine. Transmission is a 5-speed Allison model DP8962 with automatic lockup and manual override. Two fluid ends are available – 3-1/2" plungers and 5" plungers.

Continental Emsco DB-550 duplex pump 7-1/2" X 16" cylinders, 550 hp, 65 spm. Powered by a Caterpillar D-379 diesel engine turbo charged. Complete with radiator, fan, muffler, and airflex clutch.

**Generators:** Two Caterpillar 3406 turbo charged diesel engines on 250 KW Kato generator set. Cutler Hammer control center in an 8' X 10' building. Complete with transformers and switchboard.

**Traveling Block and Hook:** 200 ton (400,000 lb) unitized traveling block with four 30" sheaves grooved for 1-1/8" line.

**Swivel:** Two Gardner Denver 200 ton swivel or WARM 15 NV-14 15,000 psi swivel. 15,000 psi Kelly hose available.

**Air Supply:** Gardner Denver ADL electric air compressor.

**Choke Manifold:** 2" X 3,000 psi choke manifold with two adjustable chokes and 2" thru-flow line with double valves.

**Blowout Preventers:** Rig is equipped with 11" 5,000 psi BOP handling system.

**Drill String:** Drill collars: 23 each 6-1/4" X 2-3/8" X 4-1/2" XH  
Drill pipe: 4,500' 4-1/2" 16.6 Grade E XH; 75 jts 3-1/2" Grade E 13.3 IF.  
Drilco Kelly 5" X 40' Hex with 6-5/8" reg left w/ 4-1/2" XH hold pin.

**Kelly Spinner:** International AH hydraulic power Kelly Spinner 6-5/8" API REG LH. Box-up, pin-down.

**Spinning Wrench:** Varco model 30.

**Mud Conditioning Equipment:** One Swaco LDS double screen shaker. One Demco Model 122 desander. One Demco Model 412-H desilter. One Demco Model 612-B mud hopper. Two Lightning 75020 mud mixers. Two Mission 5" X 6" centrifugal pumps.

#### **Tongs, Elevators, Slips:**

Foley Type B Tongs	7" Varco BJ elevators
4-1/2" BJ175 ton elevators	7" Varco casing slips
4-1/2" Varco long slips	Drill collar clamp

Mud tanks: Two steel tanks, 439-bbl total capacity, low pressure mud line with sub-gun in each section, sandtrap, and a 75-bbl pill tank. One 5" X 6" Mission centrifugal pump.

**Water Tank:** Water tank, 330 bbl with a 2" X 3" circulation pump. Dog house lowers into tank for moving.

**Drilling Instrumentation:** One Satellite automatic driller. One Totco geograph, 3-pen. Three Cameron mud gauges. One Martin Decker tong torque assembly. Mechanical rotary torque indicator mounted on rig.

**Lighting System:** Fluorescent and Mercury Vapor, vaporproof lighting system.

**Other equipment:** Cat forklift with 10,000 lb capacity extended reach.

**Other features:** Fully equipped with necessary fire fighting equipment, storage houses, tools, fittings, and ancillary equipment.